

## § 63.57

of this section. It must be substantiated by a logbook, by records of an armed force or a certificated air carrier, or by a letter signed by a certificated flight navigator and attached to the application.

### § 63.57 Skill requirements.

(a) An applicant for a flight navigator certificate must pass a practical test in navigating aircraft by—

- (1) Dead reckoning;
- (2) Celestial means; and
- (3) Radio aids to navigation.

(b) An applicant must pass the written test prescribed by § 63.53 before taking the test under this section. However, if a delay in taking the test under this section would inconvenience the applicant or an air carrier, he may take it before he receives the result of the written test, or after he has failed the written test.

(c) The test requirements for this section are set forth in appendix A of this part.

[Doc. No. 1179, 27 FR 7970, Aug. 10, 1962, as amended by Amdt. 63-19, 43 FR 22639, May 25, 1978]

### § 63.59 Retesting after failure.

(a) An applicant for a flight navigator certificate who fails a written or practical test for that certificate may apply for retesting—

(1) After 30 days after the date he failed that test; or

(2) Before the 30 days have expired if the applicant presents a signed statement from a certificated flight navigator, certificated ground instructor, or any other qualified person approved by the Administrator, certifying that that person has given the applicant additional instruction in each of the subjects failed and that person considers the applicant ready for retesting.

(b) A statement from a certificated flight navigator, or from an operations official of an approved navigator course, is acceptable, for the purposes of paragraph (a)(2) of this section, for the written test and for the flight test. A statement from a person approved by the Administrator is acceptable for the written tests. A statement from a supervising or check navigator with the United States Armed Forces is accept-

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able for the written test and for the practical test.

(c) If the applicant failed the flight test, the additional instruction must have been administered in flight.

[Doc. No. 1179, 27 FR 7970, Aug. 10, 1962, as amended by Amdt. 63-19, 43 FR 22640, May 25, 1978]

### § 63.61 Flight navigator courses.

An applicant for approval of a flight navigator course must submit a letter to the Administrator requesting approval, and must also submit three copies of the course outline, a description of his facilities and equipment, and a list of the instructors and their qualifications. Requirements for the course are set forth in appendix B to this part.

#### APPENDIX A TO PART 63—TEST REQUIREMENTS FOR FLIGHT NAVIGATOR CERTIFICATE

(a) *Demonstration of skill.* An applicant will be required to pass practical tests on the prescribed subjects. These tests may be given by FAA inspectors and designated flight navigator examiners.

(b) *The examination.* The practical examination consists of a ground test and a flight test as itemized on the examination check sheet. Each item must be completed satisfactorily in order for the applicant to obtain a passing grade. Items 5, 6, 7 of the ground test may be completed orally, and items 17, 22, 23, 34, 36, 37, 38, and 39 of the flight test may be completed by an oral examination when a lack of ground facilities or navigation equipment makes such procedure necessary. In these cases a notation to that effect shall be made in the "Remarks" space on the check sheet.

(c) *Examination procedure.* (1) An applicant will provide an aircraft in which celestial observations can be taken in all directions. Minimum equipment shall include a table for plotting, a drift meter or absolute altimeter, an instrument for taking visual bearings, and a radio direction finder.

(2) More than one flight may be used to complete the flight test and any type of flight pattern may be used. The test will be conducted chiefly over water whenever practicable, and without regard to radio range legs or radials. If the test is conducted chiefly over land, a chart should be used which shows very little or no topographical and aeronautical data. The total flight time will cover a period of at least four hours. Only one applicant may be examined at one time, and no applicant may perform other than navigator duties during the examination.

(3) When the test is conducted with an aircraft belonging to an air carrier, the navigation procedures should conform with those set forth in the carrier's operations manual. Items of the flight test which are not performed during the routine navigation of the flight will be completed by oral examination after the flight or at times during flight which the applicant indicates may be used for tests on those items. Since in-flight weather conditions, the reliability of the weather forecast, and the stability of the aircraft will have considerable effect on an applicant's performance, good judgment must be used by the agent or examiner in evaluating the tests.

(d) *Ground test.* For the ground test, in the order of the numbered items on the examination check sheet, an applicant will be required to:

(1) Identify without a star identifier, at least six navigational stars and all planets available for navigation at the time of the examination and explain the method of identification.

(2) Identify two additional stars with a star identifier or sky diagrams and explain identification procedure.

(3) Precompute a time-altitude curve for a period of about 20 minutes and take 10 single observations of a celestial body which is rising or setting rapidly. The intervals between observations should be at least one minute. Mark each observation on the graph to show accuracy. All observations, after corrections, shall plot within 8 minutes of arc from the time-altitude curve, and the average error shall not exceed 5 minutes of arc.

(4) Take and plot one 3-star fix and 3 LOP's of the sun. Plotted fix or an average of LOP's must fall within 5 miles of the actual position of the observer.

(5) Demonstrate or explain the compensation and swinging of a liquid-type magnetic compass.

(6) Demonstrate or explain a method of aligning one type of drift meter.

(7) Demonstrate or explain a method of aligning an astro-compass or periscopic sextant.

(e) *Flight test.* For the flight test, in the order of the numbered items on the examination check sheet, an applicant will be required to:

(1) Demonstrate his ability to read weather symbols and interpret synoptic surface and upper air weather maps with particular emphasis being placed on winds.

(2) Prepare a flight plan by zones from the forecast winds or pressure data of an upper air chart and the operator's data.

(3) Compute from the operator's data the predicted fuel consumption for each zone of the flight, including the alternate.

(4) Determine the point-of-no-return for the flight with all engines running and the equitime point with one engine inoperative.

Graphical methods which are part of the company's operations manual may be used for these computations.

(5) Prepare a cruise control (howgozit) chart from the operator's data.

(6) Enter actual fuel consumed on the cruise control chart and interpret the variations of the actual curve from the predicted curve.

(7) Check the presence on board and operating condition of all navigation equipment. Normally a check list will be used. This check will include a time tick or chronometer comparison. Any lack of thoroughness during this check will justify this item being graded unsatisfactory.

(8) Locate emergency equipment, such as, the nearest fire extinguisher, life preserver, life rafts, exits, axe, first aid kits, etc.

(9) Recite the navigator's duties and stations during emergencies for the type of aircraft used for the test.

(10) Demonstrate the proper use of a flux gate compass or gyrosyn compass (when available), with special emphasis on the caging methods and the location of switches, circuit breakers, and fuses. If these compasses are not part of the aircraft's equipment, an oral examination will be given.

(11) Be accurate and use good judgment when setting and altering headings. Erroneous application of variation, deviation, or drift correction, or incorrect measurement of course on the chart will be graded as unsatisfactory.

(12) Demonstrate or explain the use of characteristics of various chart projections used in long-range air navigation, including the plotting of courses and bearings, and the measuring of distances.

(13) Demonstrate ability to identify designated landmarks by the use of a sectional or WAC chart.

(14) Use a computer with facility and accuracy for the computation of winds, drift correction and drift angles, ground speeds, ETA's, fuel loads, etc.

(15) Determine track, ground speed, and wind by the double drift method. When a drift meter is not part of the aircraft's equipment, an oral examination on the use of the drift meter and a double drift problem shall be completed.

(16) Determine ground speed and wind by the timing method with a drift meter. When a drift meter is not part of the aircraft's equipment, an oral examination on the procedure and a problem shall be completed.

(17) Demonstrate the use of air plot for determining wind between fixes and for plotting pressure lines of position when using pressure and absolute altimeter comparisons.

(18) Give ETA's to well defined check points at least once each hour after the second hour of flight. The average error shall

not be more than 5 percent of the intervening time intervals, and the maximum error of any one ETA shall not be more than 10 percent.

(19) Demonstrate knowledge and use of D/F equipment and radio facility information. Grading on this item will be based largely on the applicant's selection of those radio aids which will be of most value to his navigation, the manner with which he uses equipment, including filter box controls, and the precision with which he reads bearings. The aircraft's compass heading and all compass corrections must be considered for each bearing.

(20) Use care in tuning to radio stations to insure maximum reception of signal and check for interference signals. Receiver will be checked to ascertain that antenna and BFO (Voice-CW) switches are in correct positions.

(21) Identify at least three radio stations using International Morse code only for identification. The agent or examiner will tune in these stations so that the applicant will have no knowledge of the direction, distance, or frequency of the stations.

(22) Take at least one radio bearing by manual use of the loop. The agent or examiner will check the applicant's bearing by taking a manual bearing on the same station immediately after the applicant.

(23) Show the use of good judgment in evaluating radio bearings, and explain why certain bearings may be of doubtful value.

(24) Determine and apply correctly the correction required to be made to radio bearings before plotting them on a Mercator chart, and demonstrate the ability to plot bearings accurately on charts of the Mercator and Lambert conformal projections.

(25) Compute the compass heading, ETA, and fuel remaining if it is assumed that the flight would be diverted to an alternate airport at a time specified by the agent or examiner.

(26) Check the counter scales of a Loran receiver for accuracy, and explain the basic (face) adjustments which affect tuning and counter alignment. A guide sheet may be used for this test.

(27) Demonstrate a knowledge of the basic principle of Loran and the ability to tune a Loran receiver, to match signals, to read time differences, to plot Loran LOP's, and to identify and use sky waves.

(28) Take and plot bearings from a consol station and explain the precautions which must be taken when tuning a radio receiver for consol signals. Also, discuss those conditions which affect the reliability of consol bearings.

(29) Demonstrate the ability to properly operate and read an absolute altimeter.

(30) Determine the "D" factors for a series of compared readings of an absolute altimeter and a pressure altimeter.

(31) Determine drift angle or lateral displacement from the true headingline by application of Bellamy's formula or a variation thereof.

(32) Interpret the altimeter comparison data with respect to the pressure system found at flight level. From this data evaluate the accuracy of the prognostic weather map used for flight planning and apply this analysis to the navigation of the flight.

(33) Interpret single LOP's for most probable position, and show how a series of single LOP's of the same body may be used to indicate the probable track and ground speed. Also, show how a series of single LOP's (celestial or radio) from the same celestial body or radio station may be used to determine position when the change of azimuth or bearing is 30° or more between observations.

(34) Select one of the celestial LOP's used during the flight and explain how to make a single line of position approach to a point selected by the agent or examiner, giving headings, times, and ETA's.

(35) Demonstrate the proper use of an astro-compass or periscopic sextant for taking bearings.

(36) Determine compass deviation as soon as possible after reaching cruising altitude and whenever there is a change of compass heading of 15° or more.

(37) Take celestial fixes at hourly intervals when conditions permit. The accuracy of these fixes shall be checked by means of a Loran, radio, or visual fix whenever practicable. After allowing for the probable error of a Loran, radio, or visual fix, a celestial fix under favorable conditions should plot within 10 miles of the actual position.

(38) Select celestial bodies for observation, when possible, whose azimuths will differ by approximately 120° for a 3-body fix and will differ by approximately 90° for a 2-body fix. The altitudes of the selected bodies should be between 25° and 75° whenever practicable.

(39) Have POMAR and any other required reports ready for transmission at time of schedule, and be able to inform the pilot in command promptly with regard to the aircraft's position and progress in comparison with the flight plan.

(40) Keep a log with sufficient legible entries to provide a record from which the flight could be retraced.

(41) Note significant weather changes which might influence the drift or ground speed of the aircraft, such as, temperature, "D" factors, frontal conditions, turbulence, etc.

(42) Determine the wind between fixes as a regular practice.

(43) Estimate the time required and average ground speed during a letdown, under conditions specified by the pilot in command.

(44) Work with sufficient speed to determine the aircraft's position hourly by celestial means and also make all other observations and records pertinent to the navigation. The applicant should be able to take the observation, compute, and plot a celestial LOP within a time limit of 8 minutes; take and plot a Loran LOP within a time limit of 3 minutes for ground waves and 4 minutes for sky waves; observe the absolute and pressure altimeters and compute the drift or lateral displacement within a time limit of 3 minutes.

(45) Be accurate in reading instruments and making computations. Errors which are made and corrected without affecting the navigation will be disregarded unless they cause considerable loss of time.

An uncorrected error in computation (including reading instruments and books) which will affect the reported position more than 25 miles, the heading more than 3°, or any ETA more than 15 minutes will cause this item to be graded unsatisfactory.

(46) Be alert to changing weather or other conditions during flight which might affect the navigation. An applicant should not fail to take celestial observations just prior to encountering a broken or overcast sky condition; and he should not fail to take a bearing on a radio station, which operates at scheduled intervals and which would be a valuable aid to the navigation.

(47) Show a logical choice and sequence in using the various navigation methods according to time and accuracy, and check the positions determined by one method against positions determined by other methods.

(48) Use a logical sequence in performing the various duties of a navigator and plan work according to a schedule. The more important duties should not be neglected for others of less importance.

#### APPENDIX B TO PART 63—FLIGHT NAVIGATOR TRAINING COURSE REQUIREMENTS

(a) *Training course outline*—(1) *Format*. The ground course outline and the flight course outline shall be combined in one looseleaf binder and shall include a table of contents, divided into two parts—ground course and flight course. Each part of the table of contents must contain a list of the major subjects, together with hours allotted to each subject and the total classroom and flight hours.

(2) *Ground course outline*. (i) It is not mandatory that a course outline have the subject headings arranged exactly as listed in this paragraph. Any arrangement of general headings and subheadings will be satisfactory provided all the subject material listed here is included and the acceptable minimum number of hours is assigned to each subject. Each general subject shall be broken

down into detail showing items to be covered.

(ii) If any agency desires to include additional subjects in the ground training curriculum, such as international law, flight hygiene, or others which are not required, the hours allotted these additional subjects may not be included in the minimum classroom hours.

(iii) The following subjects with classroom hours are considered the minimum coverage for a ground training course for flight navigators:

Subject	Classroom hours
Federal Aviation Administration .....	5
To include Parts 63, 91, and 121 of this chapter.	
Meteorology .....	40
To include:	
Basic weather principles.	
Temperature.	
Pressure.	
Winds.	
Moisture in the atmosphere.	
Stability.	
Clouds.	
Hazards.	
Air masses.	
Front weather.	
Fog.	
Thunderstorms.	
Icing.	
World weather and climate.	
Weather maps and weather reports.	
Forecasting.	
International Morse code:	
Ability to receive code groups of letters and numerals at a speed of eight words per minute	
Navigation instruments (exclusive of radio and radar) .....	20
To include:	
Compasses.	
Pressure altimeters.	
Airspeed indicators.	
Driftmeters.	
Bearing indicators.	
Aircraft octants.	
Instrument calibration and alignment.	
Charts and pilotage .....	15
To include:	
Chart projections.	
Chart symbols.	
Principles of pilotage.	
Dead reckoning .....	30
To include:	
Air plot.	
Ground plot.	
Calculation of ETA.	
Vector analysis.	
Use of computer.	
Search.	
Absolute altimeter with:	
Applications .....	15
To include:	
Principles of construction.	
Operating instructions.	
Use of Bellamy's formula.	
Flight planning with single drift correction.	
Radio and long-range navigational aids .....	35

Subject	Classroom hours
To include: Principles of radio transmission and reception. Radio aids to navigation. Government publications. Airborne D/F equipment. Errors of radio bearings. Quadrantal correction. Plotting radio bearings. ICAO Q code for direction finding. Loran. Consol.	
Celestial navigation .....	150
To include: The solar system. The celestial sphere. The astronomical triangle. Theory of lines of position. Use of the Air Almanac. Time and its applications. Navigation tables. Precomputation. Celestial line of position approach. Star identification. Corrections to celestial observations.	
Flight planning and cruise control .....	25
To include: The flight plan. Fuel consumption charts. Methods of cruise control. Flight progress chart. Point-of-no-return. Equitime point.	
Long-range flight problems .....	15
Total (exclusive of final examinations) ..	350

(3) *Flight course outline.* (i) A minimum of 150 hours of supervised flight training shall be given, of which at least 50 hours of flight training must be given at night, and celestial navigation must be used during flights which total at least 125 hours.

(ii) A maximum of 50 hours of the required flight training may be obtained in acceptable types of synthetic flight navigator training devices.

(iii) Flights should be at least four hours in length and should be conducted off civil airways. Some training on long-range flights is desirable, but is not required. There is no limit to the number of students that may be trained on one flight, but at least one astrodrome or one periscopic sextant mounting must be provided for each group of four students.

(iv) Training must be given in dead reckoning, pilotage, radio navigation, celestial navigation, and the use of the absolute altimeter.

(b) *Equipment.* (1) Classroom equipment shall include one table at least 24" × 32" in dimensions for each student.

(2) Aircraft suitable for the flight training must be available to the approved course operator to insure that the flight training may be completed without undue delay.

The approved course operator may contract or obtain written agreements with aircraft

operators for the use of suitable aircraft. A copy of the contract or written agreement with an aircraft operator shall be attached to each of the three copies of the course outline submitted for approval. In all cases, the approved course operator is responsible for the nature and quality of instruction given during flight.

(c) *Instructors.* (1) Sufficient classroom instructors must be available to prevent an excessive ratio of students to instructors. Any ratio in excess of 20 to 1 will be considered unsatisfactory.

(2) At least one ground instructor must hold a valid flight navigator certificate, and be utilized to coordinate instruction of ground school subjects.

(3) Each instructor who conducts flight training must hold a valid flight navigator certificate.

(d) *Revision of training course.* (1) Requests for revisions to course outlines, facilities, and equipment shall follow procedures for original approval of the course. Revisions should be submitted in such form that an entire page or pages of the approved outline can be removed and replaced by the revisions.

(2) The list of instructors may be revised at any time without request for approval, provided the minimum requirement of paragraph (e) of this section is maintained.

(e) *Credit for previous training and experience.* (1) Credit may be granted by an operator to students for previous training and experience which is provable and comparable to portions of the approved curriculum. When granting such credit, the approved course operator should be fully cognizant of the fact that he is responsible for the proficiency of his graduates in accordance with subdivision (i) of paragraph (3) of this section.

(2) Where advanced credit is allowed, the operator shall evaluate the student's previous training and experience in accordance with the normal practices of accredited technical schools. Before credit is given for any ground school subject or portion thereof, the student must pass an appropriate examination given by the operator. The results of the examination, the basis for credit allowance, and the hours credited shall be incorporated as a part of the student's records.

(3) Credit up to a maximum of 50 hours toward the flight training requirement may be given to pilots who have logged at least 500 hours while a member of a flight crew which required a certificated flight navigator or the Armed Forces equivalent. A similar credit may also be given to a licensed deck officer of the Maritime Service who has served as such for at least one year on ocean-going vessels. One-half of the flight time credited under the terms of this paragraph may be applied toward the 50 hours of flight training required at night.

(f) *Students records and reports.* Approval of a course shall not be continued in effect unless the course operator keeps an accurate record of each student, including a chronological log of all instruction, subjects covered and course examinations and grades, and unless he prepares and transmits to the local Flight Standards District Office not later than January 31 of each year, a report containing the following information for the previous calendar year:

(1) The names of all students graduated, together with their school grades for ground and flight subjects.

(2) The names of all students failed or dropped, together with their school grades and reasons for dropping.

(g) *Quality of instruction.* Approval of a course shall not be continued in effect unless at least 80 percent of the students who apply within 90 days after graduation are able to qualify on the first attempt for certification as flight navigators.

(h) *Statement of graduation.* Each student who successfully completes an approved flight navigator course shall be given a statement of graduation.

(i) *Inspections.* Approved course operations will be inspected by authorized representatives of the Administrator as often as deemed necessary to insure that instruction is maintained at the required standards, but the period between inspections shall not exceed 12 months.

(j) *Change of ownership, name, or location—*

(1) *Change of ownership.* Approval of a flight navigator course shall not be continued in effect after the course has changed ownership. The new owner must obtain a new approval by following the procedure prescribed for original approval.

(2) *Change in name.* An approved course changed in name but not changed in ownership shall remain valid if the change is reported by the approved course operator to the local Flight Standards District Office. A letter of approval under the new name will be issued by the regional office.

(3) *Change in location.* An approved course shall remain in effect even though the approved course operator changes location if the change is reported without delay by the operator to the local Flight Standards District Office, which will inspect the facilities to be used. If they are found to be adequate, a letter of approval showing the new location will be issued by the regional office.

(k) *Cancellation of approval.* (1) Failure to meet or maintain any of the requirements set forth in this section for the approval or operation of an approved flight navigator course shall be considered sufficient reason for cancellation of the approval.

(2) If an operator should desire voluntary cancellation of his approved course, he should submit the effective letter of approval and a written request for cancellation

to the Administrator through the local Flight Standards District Office.

(l) *Duration.* The authority to operate an approved flight navigator course shall expire 24 months after the last day of the month of issuance.

(m) *Renewal.* Application for renewal of authority to operate an approved flight navigator course may be made by letter to the local Flight Standards District Office at any time within 60 days before to the expiration date. Renewal of approval will depend upon the course operator meeting the current conditions for approval and having a satisfactory record as an operator.

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#### APPENDIX C TO PART 63—FLIGHT ENGINEER TRAINING COURSE REQUIREMENTS

(a) *Training course outline—*(1) *Format.* The ground course outline and the flight course outline are independent. Each must be contained in a looseleaf binder to include a table of contents. If an applicant desires approval of both a ground school course and a flight school course, they must be combined in one looseleaf binder that includes a separate table of contents for each course. Separate course outlines are required for each type of airplane.

(2) *Ground course outline.* (i) It is not mandatory that the subject headings be arranged exactly as listed in this paragraph. Any arrangement of subjects is satisfactory if all the subject material listed here is included and at least the minimum programmed hours are assigned to each subject. Each general subject must be broken down into detail showing the items to be covered.

(ii) If any course operator desires to include additional subjects in the ground course curriculum, such as international law, flight hygiene, or others that are not required, the hours allotted these additional subjects may not be included in the minimum programmed classroom hours.

(iii) The following subjects and classroom hours are the minimum programmed coverage for the initial approval of a ground training course for flight engineers. Subsequent to initial approval of a ground training course an applicant may apply to the Administrator for a reduction in the programmed hours. Approval of a reduction in the approved programmed hours is based on improved training effectiveness due to improvements in methods, training aids, quality of instruction, or any combination thereof.

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Subject	Classroom hours
Federal Aviation Regulations .....	10
To include the regulations of this chapter that apply to flight engineers	
Theory of Flight and Aerodynamics .....	10
Airplane Familiarization .....	90
To include as appropriate:	
Specifications.	
Construction features.	
Flight controls.	
Hydraulic systems.	
Pneumatic systems.	
Electrical systems.	
Anti-icing and de-icing systems.	
Pressurization and air-conditioning systems.	
Vacuum systems.	
Pilot static systems.	
Instrument systems.	
Fuel and oil systems.	
Emergency equipment.	
Engine Familiarization .....	45
To include as appropriate:	
Specifications.	
Construction features.	
Lubrication.	
Ignition.	
Carburetor and induction, supercharging and fuel control systems	
Accessories.	
Propellers.	
Instrumentation.	
Emergency equipment.	
Normal Operations (Ground and Flight) .....	50
To include as appropriate:	
Servicing methods and procedures.	
Operation of all the airplane systems.	
Operation of all the engine systems.	
Loading and center of gravity computations.	
Cruise control (normal, long range, maximum endurance)	
Power and fuel computation.	
Meteorology as applicable to engine operation	
Emergency Operations .....	80
To include as appropriate:	
Landing gear, brakes, flaps, speed brakes, and leading edge devices	
Pressurization and air-conditioning.	
Portable fire extinguishers.	
Fuselage fire and smoke control.	
Loss of electrical power.	
Engine fire control.	
Engine shut-down and restart.	
Oxygen.	
Total (exclusive of final tests) .....	235

The above subjects, except Theory of Flight and Aerodynamics, and Regulations must apply to the same type of airplane in which the student flight engineer is to receive flight training.

(3) Flight Course Outline. (i) The flight training curriculum must include at least 10 hours of flight instruction in an airplane specified in §63.37(a). The flight time required for the practical test may not be credited as part of the required flight instruction.

(ii) All of the flight training must be given in the same type airplane.

(iii) As appropriate to the airplane type, the following subjects must be taught in the flight training course:

## SUBJECT

## NORMAL DUTIES, PROCEDURES AND OPERATIONS

To include as appropriate:

Airplane preflight.  
Engine starting, power checks, pretakeoff, postlanding and shut-down procedures.  
Power control.  
Temperature control.  
Engine operation analysis.  
Operation of all systems.  
Fuel management.  
Logbook entries.  
Pressurization and air conditioning.

## RECOGNITION AND CORRECTION OF IN-FLIGHT MALFUNCTIONS

To include:

Analysis of abnormal engine operation.  
Analysis of abnormal operation of all systems.  
Corrective action.

## EMERGENCY OPERATIONS IN FLIGHT

To include as appropriate:

Engine fire control.  
Fuselage fire control.  
Smoke control.  
Loss of power or pressure in each system.  
Engine overspeed.  
Fuel dumping.  
Landing gear, spoilers, speed brakes, and flap extension and retraction.  
Engine shut-down and restart.  
Use of oxygen.

(iv) If the Administrator finds a simulator or flight engineer training device to accurately reproduce the design, function, and control characteristics, as pertaining to the duties and responsibilities of a flight engineer on the type of airplane to be flown, the flight training time may be reduced by a ratio of 1 hour of flight time to 2 hours of airplane simulator time, or 3 hours of flight engineer training device time, as the case may be, subject to the following limitations:

(a) Except as provided in subdivision (b) of this paragraph, the required flight instruction time in an airplane may not be less than 5 hours.

(b) As to a flight engineer student holding at least a commercial pilot certificate with an instrument rating, airplane simulator or a combination of airplane simulator and flight engineer training device time may be submitted for up to all 10 hours of the required flight instruction time in an airplane. However, not more than 15 hours of flight engineer training device time may be substituted for flight instruction time.

(v) To obtain credit for flight training time, airplane simulator time, or flight engineer training device time, the student must

occupy the flight engineer station and operate the controls.

(b) *Classroom equipment.* Classroom equipment should consist of systems and procedural training devices, satisfactory to the Administrator, that duplicate the operation of the systems of the airplane in which the student is to receive his flight training.

(c) *Contracts or agreements.* (1) An approved flight engineer course operator may contract with other persons to obtain suitable airplanes, airplane simulators, or other training devices or equipment.

(2) An operator who is approved to conduct both the flight engineer ground course and the flight engineer flight course may contract with others to conduct one course or the other in its entirety but may not contract with others to conduct both courses for the same airplane type.

(3) An operator who has approval to conduct a flight engineer ground course or flight course for a type of airplane, but not both courses, may not contract with another person to conduct that course in whole or in part.

(4) An operator who contracts with another to conduct a flight engineer course may not authorize or permit the course to be conducted in whole or in part by a third person.

(5) In all cases, the course operator who is approved to operate the course is responsible for the nature and quality of the instruction given.

(6) A copy of each contract authorized under this paragraph must be attached to each of the 3 copies of the course outline submitted for approval.

(d) *Instructors.* (1) Only certificated flight engineers may give the flight instruction required by this appendix in an airplane, simulator, or flight engineer training device.

(2) There must be a sufficient number of qualified instructors available to prevent an excess ratio of students to instructors.

(e) *Revisions.* (1) Requests for revisions of the course outlines, facilities or equipment must follow the procedures for original approval of the course. Revisions must be submitted in such form that an entire page or pages of the approved outline can be removed and replaced by the revisions.

(2) The list of instructors may be revised at any time without request for approval, if the requirements of paragraph (d) of this appendix are maintained.

(f) *Ground school credits.* (1) Credit may be granted a student in the ground school course by the course operator for comparable previous training or experience that the student can show by written evidence; however, the course operator must still meet the quality of instruction as described in paragraph (h) of this appendix.

(2) Before credit for previous training or experience may be given, the student must pass a test given by the course operator on

the subject for which the credit is to be given. The course operator shall incorporate results of the test, the basis for credit allowance, and the hours credited as part of the student's records.

(g) *Records and reports.* (1) The course operator must maintain, for at least two years after a student graduates, fails, or drops from a course, a record of the student's training, including a chronological log of the subject course, attendance examinations, and grades.

(2) Except as provided in paragraph (3) of this section, the course operator must submit to the Administrator, not later than January 31 of each year, a report for the previous calendar year's training, to include:

(i) Name, enrollment and graduation date of each student;

(ii) Ground school hours and grades of each student;

(iii) Flight, airplane simulator, flight engineer training device hours, and grades of each student; and

(iv) Names of students failed or dropped, together with their school grades and reasons for dropping.

(3) Upon request, the Administrator may waive the reporting requirements of paragraph (2) of this section for an approved flight engineer course that is part of an approved training course under subpart N of part 121 of this chapter.

(h) *Quality of instruction.* (1) Approval of a ground course is discontinued whenever less than 80 percent of the students pass the FAA written test on the first attempt.

(2) Approval of a flight course is discontinued whenever less than 80 percent of the students pass the FAA practical test on the first attempt.

(3) Notwithstanding paragraphs (1) and (2) of this section, approval of a ground or flight course may be continued when the Administrator finds—

(i) That the failure rate was based on less than a representative number of students; or

(ii) That the course operator has taken satisfactory means to improve the effectiveness of the training.

(i) *Time limitation.* Each student must apply for the written test and the flight test within 90 days after completing the ground school course.

(j) *Statement of course completion.* (1) The course operator shall give to each student who successfully completes an approved flight engineer ground school training course, and passes the FAA written test, a statement of successful completion of the course that indicates the date of training, the type of airplane on which the ground course training was based, and the number of hours received in the ground school course.

(2) The course operator shall give each student who successfully completes an approved flight engineer flight course, and passed the



FAA practical test, a statement of successful completion of the flight course that indicates the dates of the training, the type of airplane used in the flight course, and the number of hours received in the flight course.

(3) A course operator who is approved to conduct both the ground course and the flight course may include both courses in a single statement of course completion if the provisions of paragraphs (1) and (2) of this section are included.

(4) The requirements of this paragraph do not apply to an air carrier or commercial operator with an approved training course under part 121 of this chapter providing the student receives a flight engineer certificate upon completion of that course.

(k) *Inspections.* Each course operator shall allow the Administrator at any time or place, to make any inspection necessary to ensure that the quality and effectiveness of the instruction are maintained at the required standards.

(l) *Change of ownership, name, or location.*

(1) Approval of a flight engineer ground course or flight course is discontinued if the ownership of the course changes. The new owner must obtain a new approval by following the procedure prescribed for original approval.

(2) Approval of a flight engineer ground course or flight course does not terminate upon a change in the name of the course that is reported to the Administrator within 30 days. The Administrator issues a new letter of approval, using the new name, upon receipt of notice within that time.

(3) Approval of a flight engineer ground course or flight course does not terminate upon a change in location of the course that is reported to the Administrator within 30 days. The Administrator issues a new letter of approval, showing the new location, upon receipt of notice within that time, if he finds the new facilities to be adequate.

(m) *Cancellation of approval.* (1) Failure to meet or maintain any of the requirements of this appendix for the approval of a flight engineer ground course or flight course is reason for cancellation of the approval.

(2) If a course operator desires to voluntarily terminate the course, he should notify the Administrator in writing and return the last letter of approval.

(n) *Duration.* Except for a course operated as part of an approved training course under subpart N of part 121 of this chapter, the approval to operate a flight engineer ground course or flight course terminates 24 months after the last day of the month of issue.

(o) *Renewal.* (1) Renewal of approval to operate a flight engineer ground course or flight course is conditioned upon the course operator's meeting the requirements of this appendix.

(2) Application for renewal may be made to the Administrator at any time after 60 days before the termination date.

(p) *Course operator approvals.* An applicant for approval of a flight engineer ground course, or flight course, or both, must meet all of the requirements of this appendix concerning application, approval, and continuing approval of that course or courses.

(q) *Practical test eligibility.* An applicant for a flight engineer certificate and class rating under the provisions of §63.37(b)(6) is not eligible to take the practical test unless he has successfully completed an approved flight engineer ground school course in the same type of airplane for which he has completed an approved flight engineer flight course.

[Doc. No. 6458, 30 FR 14560, Nov. 23, 1965, as amended by Amdt. 63–15, 37 FR 9758, May 17, 1972]

## PART 65—CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREW- MEMBERS

SPECIAL FEDERAL AVIATION REGULATION NO.  
100–1 [NOTE]

SPECIAL FEDERAL AVIATION REGULATION NO.  
103

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Sec.

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